

From "Imperial Treasure Repository" to "Digital Aggregation": A Digitalization Study Based on the Palace Museum's "Digital Treasure Cabinet"

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ABSTRACT

Digital technology is profoundly reconstructing the traditional imperial collection paradigm. The Palace Museum's "Digital Treasure Cabinet" project achieves the transformation of cultural heritage from physical enclosure to digital sharing by inheriting the appreciation-collection logic of Qianlong's Treasure Cabinet while innovating its power structure. Technological iteration drives the evolution from "object-borne authority" to "data-borne wisdom," analyzed through spatiality, power structure, experience model, and value dimension. Although technology breaks spatiotemporal constraints to promote cultural communication, it exacerbates inequalities in resource allocation. China's practice, leveraging its imperial collection system through data integration, virtual reorganization, and public interpretation platforms, activates local cultural genes and provides a "technology-culture" dual-driven solution. However, academic doubts persist high-precision digitalization costs widen resource gaps for small museums, and open interpretation may lead to over-commercialized misinterpretations, eroding authenticity. To address this, the study advocates a "preservation-regeneration" value system to balance conservation and communication ethically, transforming heritage into a "living" knowledge repository co-built by the public.

KEYWORDS

Digital treasure cabinet; Digital transformation; Artifact order and virtual aggregation; Art interpretation

1 Introduction

Against the global digital revolution, museums—as pivotal custodians of cultural heritage—must embrace digital transformation to transcend spatiotemporal constraints and expand public access. However, this shift entails significant challenges: high-precision digitization demands substantial resources and risks information distortion, while ethical dilemmas arise from balancing authenticity against commercialization and addressing security, intellectual property, and cross-regional inequities. In this context, the Palace Museum's "Digital Treasure Cabinet" project emerges as a critical practice, revitalizing Qianlong-era appreciation-collection logic through digital innovation. This initiative holds tripartite significance: Culturally, it enables spatiotemporal transcendence for public engagement with imperial collection heritage; Academically, it offers a paradigm for analyzing digital impacts on traditional collection models; Practically, it provides scalable methodologies for museum digitization globally.

By integrating technological capabilities with cultural inheritance, the project navigates digital challenges while redefining heritage dissemination.

2 Foundation: artifact selection and imperial power system in qianlong's treasure cabinet

2.1 Origins and selection mechanism

The Qing Treasure Cabinet emerged within a cross-cultural context, sharing with the Western Wunderkammera role as an elite cognitive framework for interpreting material culture. Artifacts underwent a rigorous selection process—archival evidence confirms the principle of "selecting only the finest and rarest," with top-tier objects displayed in the Treasure Cabinet and secondary items stored in the "Baishijian." This hierarchy reinforced imperial authority through exquisite craftsmanship and structured management.

2.2 Power structure and knowledge production

The Treasure Cabinet materialized imperial control through a strict classification system (by type, rank, and purpose) and restricted access limited to the inner court. Its design incorporated interactive elements—such as nested lattice structures—that created an intellectual game-like space, engaging the emperor in artifact combination and spatial layout. This system functioned as a "mobile knowledge graph," integrating objects into a discourse of power and sustaining a knowledge production regime centered on imperial authority.

3 Reconstruction: virtual aggregation and public-oriented transformation of the digital treasure cabinet

3.1 Digital activation of tradition: digital objectives and inheritance logic

The Palace Museum's "Digital Treasure Cabinet" project seeks to digitally revitalize the traditional Treasure Cabinet's cultural DNA, preserving its distinctive philosophy of collection and aesthetic appreciation. This effort begins with

comprehensive digital acquisition of artifact information—including high-resolution images, precise dimensions, material composition, craft techniques, and historical context—transforming physical artifacts into immutable digital resources to safeguard the integrity and authenticity of cultural information.

Inherent in its design is a commitment to inherit the traditional Treasure Cabinet's organizational logic. Artifacts in the digital environment are classified and combinatively presented according to historical principles, allowing modern audiences to intuitively grasp the spatial and conceptual order of the original collection system. Through virtual reconstructions, the project also introduces new forms of aesthetic interaction—for instance, audiences may explore dynamically composed artifact groupings within simulated environments, echoing the traditional emphasis on harmony and meaning in display.

Furthermore, the project emphasizes the transmission of historical and cultural narratives embedded within artifacts. By digitally excavating and presenting the stories connected to each object, it enriches the visitor's experience with layers of historical knowledge, achieving a contemporary reactivation of the traditional Treasure Cabinet's cultural genes while enhancing public accessibility to once-imperial collections.

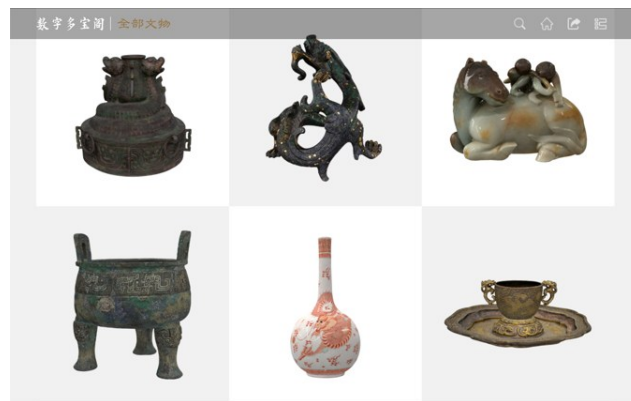


Figure 1 Homepage of the "digital treasure cabinet"

3.2 Virtual reorganization: data aggregation and cross-temporal connection construction

Through advanced cross-database integration technology for artifact data, the project achieves cross-temporal connections that are impossible with the physical Treasure Cabinet. In the physical Treasure Cabinet, artifacts are confined to specific positions due to physical space limitations, making it difficult to effectively display connections between artifacts from different time periods and regions. In contrast, the Digital Treasure Cabinet breaks this limitation by integrating artifact data from different storage facilities and periods of the Palace Museum to establish a unified database.

Through data aggregation, the Digital Treasure Cabinet enables the virtual reorganization of artifacts from different eras, types, and origins. For example, a Tang Dynasty porcelain piece can be displayed alongside a Qing Dynasty replica, allowing the audience to clearly see the inheritance and evolution between the two; similarly, similar artifacts unearthed from different regions can be connected to demonstrate the exchange and integration between different cultures. This cross-temporal connection construction not only enriches the content and form of artifact display but also provides the audience with a broader perspective and deeper thinking space, helping them better understand the historical value and cultural significance of the artifacts.

3.3 Experience reconstruction: open interaction and user empowerment mechanism

The interactive interface design of the "Digital Treasure Cabinet" fully embodies open interaction and user empowerment mechanisms, subverting the traditional exclusive appreciation tradition of the physical Treasure Cabinet. The interactive interface adopts a concise and user-friendly design concept, enabling audiences of different age groups and computer literacy levels to easily operate it.

Audiences can freely browse the artifacts in the Treasure Cabinet using devices such as mice and touchscreens, zoom in or out of artifact images, and view detailed information about the artifacts. More importantly, audiences can independently combine and explore the artifacts according to their interests and needs. For example, audiences can add different artifacts to a virtual collection folder for comparison and research, or use the search function to quickly find artifacts of interest and learn about other related artifact information. This open interactive design empowers the public with independent exploration rights, transforming the audience from passive information receivers into active information acquirers and explorers. Audiences can appreciate and understand artifacts at their own pace and in their own way, obtaining a more personalized and in-depth experience, and completely breaking the exclusivity of the traditional Treasure Cabinet, which was accessible only to a small number of people.

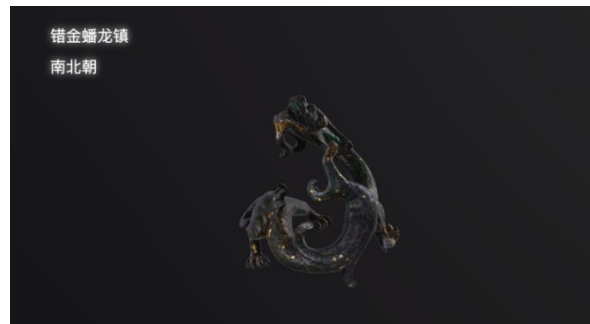


Figure 2 Specific artifact page of the digital treasure cabinet(gilt gold dragon coiling weight, northern and southern dynasties)

3.4 Value remodeling: knowledge sharing and public interpretation system

By establishing a knowledge-sharing mechanism, the value system of cultural artifacts has been reshaped, with the right of interpretation gradually transferred from institutions to the public. In traditional imperial collections, the right to interpret artifacts was primarily held by the imperial family and a small group of experts; ordinary members of the public had little opportunity to participate in the interpretation and analysis of these artifacts.

The "Digital Treasure Cabinet" project, however, has broken this pattern. It has created an open digital platform that makes a wealth of artifact information and research findings accessible to the public. On this platform, users can access detailed artifact data, research literature, and interpretive perspectives from various experts. Additionally, the platform provides a space for public communication and interaction, allowing audiences to share their own views, impressions, and interpretations of artifacts, as well as engage in discussions with other users. This knowledge-sharing mechanism enables the public to gain a deeper understanding of cultural artifacts and actively participate in the process of interpreting them.

As public participation increases, public interpretations have gradually become an integral part of the artifact value system. This has broken the institutional monopoly on the right of interpretation, realizing the remodeling of the value system and allowing the value of cultural artifacts to be reflected in a more diverse manner through broader public engagement.

4 Transformation of appreciation-collection logic: from imperial private collection to digital sharing

4.1 Spatial transformation: from physical enclosure to digital openness

Physical Treasure Cabinets were characterized by extreme physical enclosure, typically placed in designated palace areas with strict access restrictions, allowing only a handful of people to interact with artifacts within limited spaces. In contrast, the "Digital Treasure Cabinet" achieves a shift to digital openness, transcending physical constraints through an online platform accessible to anyone with internet access. This transformation is realized by converting physical artifacts into digital resources and employing technologies like virtual reality (VR) and 3D modeling to create immersive experiences, significantly expanding the audience reach and enhancing cultural heritage influence.

4.2 Power structure shift: from imperial monopoly to public interpretation

In traditional imperial collections, the imperial family held a monopoly on artifact interpretation, disseminating meanings tied to imperial power through official channels, forcing passive public acceptance. The "Digital Treasure Cabinet" drives a shift to public interpretation, providing an open digital platform for diverse and individual public expressions. This power transfer benefits from digital technology's convenience in information dissemination and progressive social attitudes recognizing public roles in heritage dissemination, breaking imperial monopoly and enriching artifact meanings through participatory engagement.

4.3 Experience model reconstruction: from physical touch to interactive cognition

The appreciation experience of physical Treasure Cabinets relied on tactile interaction, where privileged individuals like the Qianlong Emperor perceived physical properties such as texture and weight, enabling intuitive connection. The "Digital Treasure Cabinet" undergoes a fundamental shift to interactive cognition, where audiences engage through screens using devices to zoom, rotate, and access detailed information, emphasizing information acquisition and intellectual engagement. While lacking physical touch, digital interaction offers deeper understanding through rich data and flexible methods, focusing on cognitive over sensory experience.

4.4 Value dimension expansion: from material preservation to knowledge regeneration

Traditional Treasure Cabinets focused on material preservation, ensuring physical integrity through sophisticated storage, with value centered on artifact survival. The "Digital Treasure Cabinet" expands this to knowledge regeneration via digital technology: high-precision 3D scanning preserves physical form and details permanently, while data

aggregation on historical and cultural connections forms a dynamic, expandable knowledge graph. This dual approach reconstructs heritage lifecycle, sustaining physical existence through preservation and activating cultural gene inheritance through regeneration.

5 Conclusion and discussion

The Palace Museum's "Digital Treasures" project stands as a landmark endeavor in digitizing the traditional imperial collection paradigm. It inherits the Qianlong-era treasury's classification logic, aesthetic principles of arrangement, and the concept of "embodying principles through artifacts." Through digital technology, it comprehensively preserves the materials, craftsmanship, and historical context of cultural relics. Its innovations lie in breaking physical barriers to enable public access, transferring interpretive authority from the imperial court to the public (through interactive interfaces allowing independent curation and interpretation), and establishing cross-temporal connections between artifacts via cross-database aggregation. This marks a shift from "objects embodying authority" to "data embodying wisdom," forming an open knowledge-sharing ecosystem. Practically, the project employs three core strategies: data integration (unified database for decentralized artifact information and dynamic display), interaction empowerment (open interface simulating Qianlong's "private appreciation," shifting from "passive viewing" to "active cognition"), and value reshaping (public interpretation platform transforming "imperial monologue" into "multiple dialogues," shifting value from institutional monopoly to public co-creation). These provide a reusable methodology for cultural heritage digitization. However, technological empowerment also reveals core contradictions: Technical constraints (high-precision data collection relies on equipment and funding, exacerbating resource inequality for small and medium-sized museums) and ethical challenges (open interpretation risks excessive entertainment and erodes cultural authenticity, while raising digital copyright and data security issues). These can be addressed through technical standards (e.g., academic norms for digital reconstruction) and ethical frameworks (e.g., blockchain for copyright tracking), building a dual-dimensional "preservation-regeneration" value system that balances conservation and dissemination. Overall, the project transforms artifacts from static carriers into a growing "digital cultural gene bank" by preserving traditional core values, innovating digital tools, and establishing open knowledge systems. This achieves a structural shift in appreciation-collection power (from imperial monopoly to public empowerment) and artifact value (from institutional monopoly to social co-creation), ultimately realizing the creative transformation of traditional appreciation wisdom in the digital era.

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